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KLINELINE BRIDGE
RESOURCE AGENCY MEETING SUMMARY
January 17, 2006

Attendees

Linda Small, Clark County Public Works, Project Manager
Karen Streeter, Clark County Public Works
Terri Brooks, Clark County Community Development
Brent Davis, Clark County Community Development
Alison Chamberlin, Washington State Department of Ecology
Lori Ochoa, Washington State Department of Ecology
Kim Van Zwalenburg, Washington State Department of Ecology
Lisa Renan, Washington Department of Fish and Wildlife
Donna Hale, Washington Department of Fish and Wildlife
Sam Kolb, Washington Department of Fish and Wildlife
John Wenbheimer, Washington Department of Fish and Wildlife
J. Patrick Klavas, Washington Department of Fish and Wildlife
Scott Anderson, NOAA Fisheries
Doug Sarkkinen, Kramer Gehlem and Associates
Susan Cunningham, Vigil-Agrimis Inc.
Ken Vigil. Vigil-Agrimis Inc.
John Vlastelicia, Vigil-Agrimis Inc.
Paul Knox, Hopper Dennis Jellison

Meeting Summary

Introductions

Project Purpose

The Klineline Bridge was originally constructed in 1927 to provide Highway 99 access over Salmon Creek. Changing stream conditions have historically resulted in recurrent and migrating headcuts within Salmon Creek, causing significant bridge damage and necessitating major repair efforts on two separate occasions.

In 1949, a headcut caused the north bank pier to fail. Following this event, the bridge was repaired by bringing the foundation back to its original level and using concrete fill to stabilize the raised footing. Additionally, a sheet pile drop structure was built immediately downstream of the bridge in an effort to prevent future headcutting, although this structure was not anchored to the banks. In 1956, the headcut proceeded around the side of the drop structure, causing the south bank pier to fail and two spans of the bridge to collapse into Salmon Creek. After this failure, repairs were made that included pouring concrete into the streambed for most of its width between the bridge and the previously-built (1949) drop structure. At this time, the drop structure was also anchored into the stream banks to prevent future recurrences of the headcut circumventing the structure.

The 1956 bridge repairs have protected the bridge from any further damage due to headcutting. However, following major flooding in the winter of 1996, a waterfall (headcut) appeared downstream of the bridge. It is unclear whether this headcut occurred gradually over time or was formed by the 1996 flood, although it apparently

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had not been documented prior to the flood. This headcut, which exhibits a drop of about 8 vertical feet, has migrated approximately 50 feet upstream since it was first noticed in 1996. It has damaged the drop structure installed in 1949 and currently presents a risk to the bridge's middle pier.

Bridge Replacement Design

The existing Klineline Bridge is a four-span concrete structure that is approximately 60 feet wide. The bridge is supported by four concrete abutments: one within the stream channel; one on the south bank of the creek; and two on the north bank of the creek. The bridge structure and all four piers will be removed as part of the project.

A new single-span bridge will be constructed in the place of the existing bridge. The new bridge will be approximately 152 feet long and will be widened to approximately 86 feet, with the expansion in width occurring on the eastern side of the existing bridge alignment. The new bridge will include four vehicle travel lanes (two each direction), bike lanes, and pedestrian sidewalks. The new bridge will be constructed with pre-cast and pre-stressed concrete girders. Two abutments, located on either side of the creek, will support the new bridge. These abutments will be supported by drilled shafts with concrete pier caps. The pier caps will be used, along with other retaining walls, to support the ends and sides of the abutment backfill and fill for the roadway approaches

The bridge replacement and associated stream restoration activities will occur within and adjacent to Salmon Creek, extending from approximately 100 feet upstream of the bridge to approximately 200 feet downstream of the bridge. The project footprint is considered to encompass all areas directly affected by temporary or permanent disturbance from activities related to the removal of the existing Klineline Bridge, the construction of the new bridge, and the associated stream restoration activities. This footprint includes areas planned for vegetative clearing and planting; soil/sediment excavation, fill, and grading; vehicle/equipment access and staging; and new structural features (e.g., bridge piers).

During another 100-year flood event in the spring 1996, a weak point in the concrete collapsed, creating a four-foot headcut, which has since migrated upstream and degraded further to an 8' waterfall, which is largely impassable to fish. The effects of this headcut in the center of the channel has been observed and well documented. An existing conditions HEC-RAS model was subsequently developed by hydrology consultants and Clark County Public Works between 1997-1998, to determine the best approach to mitigate the fish passage barrier and restore the creek bed. The model was calibrated based on 10-, 50-, and 100-year flood profiles, as well as on the observed high water mark for flood events in 1949 and 1996. An engineered structure composed of rock weirs spanning the creek by adjusting the thalweg was recommended to protect the bridge piers and restore the creek bed elevations. This earlier work did not proceed due to lack of funding.

The current channel reconstruction activities will incorporate the removal of the concrete channel lining and subsequent barrier that has formed and other artificial materials within the channel. In late 2005, an alternatives analysis was completed by environmental consultants Vigil-Agrimis and structural engineers, Kramer Gehlen Associates, to address the condition of the stream channel in conjunction with the replacement of the Klineline Bridge over Highway 99. A series of primary grade control structures are proposed, incorporating buried rock and sheet piling strategically positioned to provide long term gradient controls. It is important to point out that none of these engineering structures will be viewable—they will be buried 1-2 feet below the stream channel surface. A set of rock weirs will be constructed on the stream surface, with drop pools; and the entire channel area will be reconstructed with native cobble and river-rock gravels; there will be no riprap incorporated into the project design. Clark County is confident this approach will provide a stable, long-term solution to grade control in the vicinity of the bridge, minimize impacts to waterway while still providing a natural channel structure that allows year-round

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fish passage for juvenile and adult salmon. The project also will remove the obviously "manmade" structures in the channel—concrete lining and rebar are the current channel condition.

Fish Passage and Stream Channel Drop Structures

The proposed conceptual design for the stream restoration involves establishing a series of grade control structures to eliminate the current 8' vertical drop, or headcut, below the bridge and create a more uniformly sloping streambed in the project reach. The drop structures will improve fish passage, and allow for historic habitat to be repopulated. This will provide opportunity for year-round passage for anadromous salmonids in Salmon Creek, increasing the period of access to a significant amount of stream habitat in the middle and upper portions of the watershed. The falls at the Klineline Bridge represent the uppermost extent of the designated "critical habitat" for Columbia River chum salmon, which are less able to clear barriers than other salmonids (e.g., steelhead); thus, the removal of this barrier will provide access to additional habitat available to chum salmon. Additionally, the barrier removal would allow for freer movement of resident stocks within the creek.

The drop structure placement in the project area will fix the bed profile, adjust the thalweg alignment, and pattern of sediment scour and deposition. Placement of woody debris and bank restoration will improve habitat complexity, while providing stabilization to mitigate bank erosion and ensure a stable bridge embankment. A series of strategically positioned, engineered rock structures are proposed by this project as the long-term solution for streambed stabilization, bank protection, and habitat improvements. (Exhibit 5)

Drop structures, also known as grade controls, sills or weirs, have been used extensively in Washington State to stabilize channel grades, improve fish passage and to reduce erosion. The structures proposed for this project are intended to create surface turbulence and bubbles to provide hiding cover, and a diversity of plunge pools, eddies, velocity chutes, and areas that will be of benefit to a host of fish and other aquatic organisms. The barrier removals and in-channel improvements in Salmon Creek are intended to ultimately extend upstream and down stream of the application.

Floodplain Reconnection

Through various processes, basin development has resulted in many of the stream channels in the Salmon Creek watershed becoming deeply incised. The lower portion of the Salmon Creek maintstem, including the Klineline Bridge site, is a low-gradient, confined system where much of the floodplain no longer functions properly due to a loss of hydrologic connection with the creek. In the vicinity of the bridge, channel incision over the last few decades has dramatically lowered the real floodplain elevations. To compound the problem, increased development and impervious surface in the watershed has resulted in larger volumes of water entering Salmon Creek during storm events which has caused downstream flooding problems.

This project presents an opportunity to improve floodplain conditions locally. Regrading the stream bed and reshaping the stream banks as part of the stream restoration effort may allow the re-establishment of a stream connection to the historic floodplain. The benefits associated with this reconnection (e.g., increased flood storage) would be desirable considering the extent to which floodplain function in the watershed has been impaired.

Stormwatar

This project proposes to utilize the existing stormwater collection and treatment systems until such time as a regional stormwater management facility is constructed with the future Highway 99 Corridor projects. The County

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has committed design funding for the next phase of the Highway 99 Corridor, which would provide the regional facility. Storm sewer improvements will be installed which will be sized to convey build-out flows to the regional facility. The project does not result in an increase in impervious surface. Three county capital improvement projects have been constructed within the last three years which provide stormwater treatment in accordance with current county standards for the existing impervious surfaces which drain onto and from the bridge and its approaches. Construction of the proposed bridge and roadway approaches will not result in a reduction of the level of stormwater treatment which is currently being provided. In accordance with the WSDOT Highway Runoff Manual (March 2004), the project does not meet the Western Washington thresholds for runoff treatment or flow control and appears to meet the criteria needed to qualify for a stormwater exemption under the provisions of Section 40.380.030(B) of the Clark County Stormwater and Erosion Control Ordinance.

Design input/Recommendations

Overall the design teams left the meeting feeling we were on the right the track with the design. A few comments and design recommendations were suggested and summarized below:

It appears that the design is more of a fishway than stream restoration. If the design goes forward with the sheet piling/grade controls, the design team should make sure that the design meets the requirements of a fishway.

More habitat features (LWD, riparian plantings, fish rock, etc.) should be incorporated into the design.

The bridge design looks good.

It would be preferred to have the construction done in one construction season.

Justification/documentation of the proposed 3% grade through the project area representative of Salmon Creek needs to be provided. It would be preferable to lengthen the stretch of stream to be restored to achieve a 1-2% grade.

An exemption for stormwater treatment might not be possible. Further evaluation needs to be done. Allison will put Paul in contact with the appropriate people at Ecology to discuss the issue further.

Ecology is willing to help us bundle the permit applications to expedite the process and ensure coordination between the agencies.